COURTESY COPY OF THE PENDING CLAIMS AS AMENDED

1. An isolated or recombinant nucleic acid, comprising:

a polynucleotide sequence selected from the group consisting of:

(a) SEQ ID NO:1 to SEQ ID NO:35, or a complementary polynucleotide sequence thereof;

(b) a polynucleotide sequence encoding a polypeptide selected from SEQ ID NO:36 to SEQ ID NO:70, or a complementary polynucleotide sequence thereof;

(c) a polynucleotide sequence which hybridizes under highly stringent conditions over substantially the entire length of polynucleotide sequence (a) or (b); and

(d) a polynucleotide sequence comprising a fragment of (a), (b), or (c), which fragment encodes a polypeptide having antiproliferative activity in a human Daudi cell line - based assay.

2. An isolated or recombinant nucleic acid, comprising:

a polynucleotide sequence selected from the group consisting of:

(a) SEQ ID NO:72 to SEQ ID NO:78, or a complementary polynucleotide sequence thereof;

(b) a polynucleotide sequence encoding a polypeptide selected from SEQ ID NO:79 to SEQ ID NO:85, or a complementary polynucleotide sequence thereof;

(c) a polynucleotide sequence which hybridizes under highly stringent conditions over substantially the entire length of polynucleotide sequence (a) or (b); and

(d) a polynucleotide sequence comprising a fragment of (a), (b) or (c), which fragment encodes a polypeptide having antiviral activity in a murine cell line/EMCV - based assay.

3. An isolated or recombinant nucleic acid, comprising:

a polynucleotide sequence encoding a polypeptide, the polypeptide comprising the amino acid sequence: CDLPQTHSLG-X_{11}-X_{12}-RA-X_{15}-X_{16}-LL-X_{19}-QM-X_{22}-R-X_{24}-S-X_{26}-FSCLKDR-X_{34}-DFG-X_{38}-P-X_{40}-EEFD-X_{45}-X_{46}-X_{47}-FQ-X_{50}-X_{51}-QAI-X_{55}-X_{56}-X_{57}-HE-X_{60}-X_{61}-QQTFN-X_{67}-FSTK-X_{72}-SS-X_{75}-X_{76}-W-X_{78}-X_{79}-X_{80}-LL-X_{83}-K-X_{85}-X_{86}-T-X_{88}-L-X_{90}-QQLN-X_{95}-LEACV-X_{101}-Q-X_{103}-V-X_{105}-X_{106}-X_{107}-X_{108}-TPLMN-X_{114}-D-X_{116}-ILAV-X_{121}-KY-X_{124}-QRITLYL-X_{132}-E-X_{134}-KYSPC-X_{140}-

WEVVRAEIMRSFSFSTNLQKRLRRKE, or a conservatively substituted variation thereof, where X_{11} is N or D; X_{12} is R, S, or K; X_{15} is L or M; X_{16} is I, M, or V; X_{19} is A or G; X_{22} is G or R; X_{24} is I or T; X_{26} is P or H; X_{34} is H, Y or Q; X_{38} is F or L; X_{40} is Q or R; X_{45} is G or S; X_{46} is N or H; X_{47} is Q or R; X_{50} is K or R; X_{51} is A or T; X_{55} is S or F; X_{56} is V or A; X_{57} is L or F; X_{60} is M or I; X_{61} is I or M; X_{67} is L or F; X_{72} is D or N; X_{75} is A or V; X_{76} is A or T; X_{78} is E or D; X_{79} is Q or E; X_{80} is S, R, T, or N; X_{83} is E or D; X_{85} is F or L; X_{86} is S or Y; X_{88} is E or G; X_{90} is Y, H, N; X_{95} is D, E, or N; X_{101} is I, M, or V; X_{103} is E or G; X_{105} is G or W; X_{106} is V or M; X_{107} is E, G, or K; X_{108} is E or G; X_{114} is V, E, or G; X_{116} is S or P; X_{121} is K or R; X_{124} is F or L; X_{132} is T, I, or M; X_{134} is K or R; and X_{140} is A or S.

4. The nucleic acid of claim 3, said polypeptide having antiproliferative activity in a human Daudi cell line-based cell proliferation assay or antiviral activity in a human WISH cell/EMCV-based assay.

5. The nucleic acid of claim 3, wherein the encoded polypeptide has an antiproliferative activity of at least about $8.3x10^6$ units/milligram in a human Daudi cell line - based assay or an antiviral activity of at least about $2.1x10^7$ units/milligram in a human WISH cell/EMCV-based assay.

6. The nucleic acid of claim 3, wherein the encoded polypeptide comprises an amino acid sequence selected from the group consisting of: SEQ ID NO:36 to SEQ ID NO:54.

7. The nucleic acid of claim 3, said nucleic acid comprising a polynucleotide sequence selected from the group consisting of: SEQ ID NO:1 to SEQ ID NO:19.

8. An isolated or recombinant nucleic acid comprising a polynucleotide sequence encoding a polypeptide, the polypeptide comprising:

an amino acid sequence comprising at least 20 contiguous amino acids of any one of SEQ ID NOS:36-70, and one or more of amino acids Ala19, (Tyr or Gln)34, Gly37,

Phe38, Lys71, Ala76, Tyr90, Ile132, Arg134, Phe152, Lys160, and Glu166, wherein the numbering of the amino acids corresponds to that of SEQ ID NO:36.

9. The nucleic acid of claim 8, wherein the encoded polypeptide is 166 amino acids in length.

10. The nucleic acid of claim 8, wherein the encoded polypeptide has an antiproliferative activity in a human Daudi cell line - based assay.

11. The nucleic acid of claim 8, wherein the encoded polypeptide has an antiviral activity in a human WISH cell/EMCV-based assay.

12. The nucleic acid of claim 8, wherein the encoded polypeptide comprises amino acids Ala19, (Tyr or Gln)34, Gly37, Phe38, Lys71, Ala76, Tyr90, Ile132, Arg134, Phe152, Lys160, and Glu166.

13. The nucleic acid of claim 8, wherein the encoded polypeptide comprises at least 50 contiguous amino acid residues of any one of SEQ ID NOS:36-70.

14. The nucleic acid of claim 8, wherein the encoded polypeptide comprises at least 100 contiguous amino acid residues of any one of SEQ ID NOS:36-70.

15. The nucleic acid of claim 8, wherein the encoded polypeptide comprises at least 150 contiguous amino acid residues of any one of SEQ ID NOS:36-70.

16. The nucleic acid of claim 8, wherein the encoded polypeptide comprises an amino acid sequence selected from the group consisting of: SEQ ID NO:36, SEQ ID NO:37, SEQ ID NO:39, SEQ ID NO:40, SEQ ID NO:41, SEQ ID NO:42, SEQ ID NO:45, and SEQ ID NO:46.

17. The nucleic acid of claim 8, comprising a polynucleotide sequence selected from the group consisting of: SEQ ID NO:1, SEQ ID NO:2, SEQ ID NO:4, SEQ ID NO:5, SEQ ID NO:6, SEQ ID NO:7, SEQ ID NO:10, and SEQ ID NO:11.

18. An isolated or recombinant nucleic acid comprising a polynucleotide sequence encoding a polypeptide, the polypeptide comprising:

an amino acid sequence comprising at least 155 contiguous amino acids of any one of SEQ ID NOS:36-70, said amino acid sequence comprising amino acids Lys160 and Glu166, wherein the numbering of the amino acids corresponds to that of SEQ ID NO:36.

19. The nucleic acid of claim 18, wherein the encoded polypeptide comprises an amino acid sequence selected from the group consisting of: SEQ ID NO:36, SEQ ID NO:37, SEQ ID NO:39, SEQ ID NO:40, SEQ ID NO:41, SEQ ID NO:42, SEQ ID NO:45, and SEQ ID NO:46.

20. A cell comprising the nucleic acid of claim 1, 2, 8, or 18.

21. The cell of claim 20, wherein the cell expresses a polypeptide encoded by the nucleic acid.

22. A vector comprising the nucleic acid of claim 1, 2, 8, or 18.

23. The vector of claim 20, wherein the vector comprises a plasmid, a cosmid, a phage, or a virus.

24. The vector of claim 22, wherein the vector is an expression vector.

25. A cell transduced by the vector of claim 22.

26. A composition comprising the nucleic acid of claim 1, 2, 8, or 18, and an excipient.

27. The composition of claim 26, wherein the excipient is a pharmaceutically acceptable excipient.

28. A composition produced by digesting one or more nucleic acids of claim 1, 2, 3, 8, or 18 with a restriction endonuclease, an RNAse, or a DNAse.

29. A composition produced by a process comprising incubating one or more nucleic acids of claim 1, 2, 3, 8, or 18 in the presence of deoxyribonucelotide triphosphates and a nucleic acid polymerase.

30. The composition of claim 29, wherein the nucleic acid polymerase is a thermostable polymerase.

31. An isolated or recombinant polypeptide encoded by the nucleic acid of acid claim 1, 2, 3, 8, or 18.

32. The isolated or recombinant polypeptide of claim 31, comprising a sequence selected from the group consisting of: SEQ ID NO:36 to SEQ ID NO:70 or SEQ ID NO:79 to SEQ ID NO:85.

33. The polypeptide of claim 31, having an antiproliferative activity of at least about $8.3x10^6$ units/milligram (mg) in a human Daudi cell line - based assay or an antiviral activity of at least about $2.1x10^7$ units/milligram in a human WISH cell/EMCV-based assay.

34. An isolated or recombinant polypeptide, comprising:

the amino acid sequence: CDLPQTHSLG-X_{11}-X_{12}-RA-X_{15}-X_{16}-LL-X_{19}-QM-X_{22}-R-X_{24}-S-X_{26}-FSCLKDR-X_{34}-DFG-X_{38}-P-X_{40}-EEFD-X_{45}-X_{46}-X_{47}-FQ-X_{50}-X_{51}-QAI-X_{55}-X_{56}-X_{57}-HE-X_{60}-X_{61}-QQTFN-X_{67}-FSTK-X_{72}-SS-X_{75}-X_{76}-W-X_{78}-X_{79}-X_{80}-LL-X_{83}-K-X_{85}-X_{86}-T-X_{88}-L-X_{90}-QQLN-X_{95}-LEACV-X_{101}-Q-X_{103}-V-X_{105}-X_{106}-X_{107}-X_{108}-TPLMN-X_{114}-D-X_{116}-ILAV-X_{121}-KY-X_{124}-QRITLYL-X_{132}-E-X_{134}-KYSPC-X_{140}-WEVVRAEIMRSFSFSTNLQKRLRRKE, or a conservatively substituted variation thereof;

wherein X_{11} is N or D; X_{12} is R, S, or K; X_{15} is L or M; X_{16} is I, M, or V; X_{19} is A or G; X_{22} is G or R; X_{24} is I or T; X_{26} is P or H; X_{34} is H, Y or Q; X_{38} is F or L; X_{40} is Q or R; X_{45} is G or S; X_{46} is N or H; X_{47} is Q or R; X_{50} is K or R; X_{51} is A or T; X_{55} is S or F; X_{56} is V or A; X_{57} is L or F; X_{60} is M or I; X_{61} is I or M; X_{67} is L or F; X_{72} is D or N; X_{75} is A or V; X_{76} is A or T; X_{78} is E or D; X_{79} is Q or E; X_{80} is S, R, T, or N; X_{83} is E or D; X_{85} is F or L; X_{86} is S or Y; X_{88} is E or G; X_{90} is Y, H, N; X_{95} is D, E, or N; X_{101} is I,

M, or V; X_{103} is E or G; X_{105} is G or W; X_{106} is V or M; X_{107} is E, G, or K; X_{108} is E or G; X_{114} is V, E, or G; X_{116} is S or P; X_{121} is K or R; X_{124} is F or L; X_{132} is T, I, or M; X_{134} is K or R; and X_{140} is A or S.

35. The polypeptide of claim 34, having antiproliferative activity of at least about $8.3x10^6$ units/milligram in a human Daudi cell line - based assay or antiviral activity of at least about $2.1x10^7$ units/milligram in a human WISH cell/EMCV-based assay.

36. The polypeptide of claim 34, comprising a sequence selected from the group consisting of: SEQ ID NO:36 to SEQ ID NO:54.

37. A polypeptide comprising at least 100 contiguous amino acids of a protein encoded by a coding polynucleotide sequence, the polynucleotide sequence selected from the group consisting of:

(a) SEQ ID NO:1 to SEQ ID NO:35 or SEQ ID NO:72 to SEQ ID NO:78;

(b) a coding polynucleotide sequence that encodes a first polypeptide selected from SEQ ID NO:36 to SEQ ID NO:70 or SEQ ID NO:79 to SEQ ID NO:85; and

(c) a complementary polynucleotide sequence which hybridizes under highly stringent conditions over substantially an entire length of a polynucleotide sequence of (a) or (b).

38. The polypeptide of claim 37, said polypeptide having an antiproliferative activity in a human Daudi cell line-based cell proliferation assay or an antiviral activity in a human WISH cell/EMCV-based assay.

39. The polypeptide of claim 37, wherein the polypeptide specifically binds to a human alpha-interferon receptor.

40. The polypeptide of claim 37, comprising at least 150 contiguous amino acids of the encoded protein.

41. An isolated or recombinant polypeptide, comprising:

an amino acid sequence comprising at least 50 contiguous amino acids of any one of SEQ ID NOS:36-70, the amino acid sequence comprising one or more of amino acids Ala19, (Tyr or Gln)34, Gly37, Phe38, Lys71, Ala76, Tyr90, Ile132, Arg134, Phe152, Lys160, and Glu166, wherein the numbering of the amino acids corresponds to that of SEQ ID NO:36.

42. The polypeptide of claim 41, wherein the polypeptide binds a human alpha-interferon receptor.

43. The polypeptide of claim 41, said polypeptide exhibiting an antiproliferative activity in a human Daudi cell line-based cell proliferation assay or an antiviral activity in a human WISH cell/EMCV-based assay.

44. The polypeptide of claim 41, having an antiproliferative activity of at least about $8.3x10^6$ units/milligram in a human Daudi cell line - based assay or an antiviral activity of at least about $2.1x10^7$ units/milligram in a human WISH cell/EMCV-based assay.

45. The polypeptide of claim 41, wherein the polypeptide is 166 amino acids in length.

46. The polypeptide of claim 41, said polypeptide comprising amino acids Ala19, (Tyr or Gln)34, Gly37, Phe38, Lys71, Ala76, Tyr90, Ile132, Arg134, Phe152, Lys160, and Glu166, wherein the numbering of the amino acids of said polypeptide corresponds to the numbering of amino acids in SEQ ID NO:36.

47. The polypeptide of claim 41, comprising at least 100 contiguous amino acid residues of any one of SEQ ID NOS:36-70.

48. The polypeptide of claim 41, comprising at least 150 contiguous amino acid residues of any one of SEQ ID NOS:36-70.

49. The polypeptide of claim 41, comprising at least 155 contiguous amino acid residues of any one of SEQ ID NOS:36-70.

50. The polypeptide of claim 41, comprising an amino acid sequence selected from the group consisting of: SEQ ID NO:36, SEQ ID NO:37, SEQ ID NO:39, SEQ ID NO:40, SEQ ID NO:41, SEQ ID NO:42, SEQ ID NO:45, and SEQ ID NO:46.

51. An isolated or recombinant polypeptide comprising an amino acid sequence comprising at least 155 contiguous amino acids of any one of SEQ ID NOS:36-70, the isolated or recombinant polypeptide comprising amino acids Lys160 and Glu166, wherein the numbering of the amino acids corresponds to that of SEQ ID NO:36.

52. The polypeptide of claim 51, comprising an amino acid sequence selected from the group consisting of: SEQ ID NO:36, SEQ ID NO:37, SEQ ID NO:39, SEQ ID NO:40, SEQ ID NO:41, SEQ ID NO:42, SEQ ID NO:45, and SEQ ID NO:46.

53. The polypeptide of claim 51, said polypeptide having an antiproliferative activity of at least about $8.3x10^6$ units/milligram in milligram in a human Daudi cell line - based assay or an antiviral activity of at least about $2.1x10^7$ units/milligram in a human WISH cell/EMCV-based assay.

54. The polypeptide of claim 34, 37, 41, or 51, further comprising a secretion/localization sequence.

55. The polypeptide of claim 34, 37, 41, or 51, further comprising a polypeptide purification subsequence.

56. The polypeptide of claim 55, wherein the sequence that facilitates purification is selected from the group consisting of: an epitope tag, a FLAG tag, a polyhistidine tag, and a GST fusion.

57. The polypeptide of claim 34, 37, 41, or 51, further comprising a Met at the N-terminus.

58. The polypeptide of claim 34, 37, 41, or 51, comprising a modified amino acid.

59. The polypeptide of claim 58, wherein the modified amino acid is selected from the group consisting of: a glycosylated amino acid, a PEGylated amino acid, a farnesylated amino acid, an acetylated amino acid, and a biotinylated amino acid.

60. A composition comprising the polypeptide of claim 34, 37, 41, or 51 and an excipient.

61. The composition of claim 60, wherein the excipient is a pharmaceutically acceptable excipient.

62. A composition comprising the polypeptide of claim 58 in a pharmaceutically acceptable excipient.

63. A polypeptide which is specifically bound by a polyclonal antisera raised against at least one antigen, said at least one antigen comprising at least one amino acid sequence of SEQ ID NO:36 to SEQ ID NO:70 or SEQ ID NO:79 to SEQ ID NO:85, or a fragment thereof, wherein the antisera is subtracted with an IFN-alpha polypeptide encoded by a nucleic acid corresponding to one or more of GenBank accession number: J00210 (alpha-D), J00207 (Alpha-A), X02958 (Alpha-6), X02956 (Alpha-5), V00533 (alpha-H), V00542 (alpha-14), V00545 (IFN-1B), X03125 (alpha-8), X02957 (alpha-16), V00540 (alpha-21), X02955 (alpha-4b), V00532 (alpha-C), X02960 (alpha-7), X02961 (alpha-10 pseudogene), R0067 (Gx-1), I01614, I01787, I07821, M12350 (alpha-F), M38289, V00549 (alpha-2a), and I08313 (alpha-Con1).

64. An antibody or antisera produced by administering the polypeptide of claim 34, 37, 41, or 51 to a mammal, which antibody or antisera specifically binds at least one antigen, said at least one antigen comprising a polypeptide comprising one or more of the amino acid sequences of SEQ ID NO:36 to SEQ ID NO:70 and SEQ ID NO:79 to SEQ ID NO:85, or a fragment thereof, which antibody or antisera does not specifically bind to an IFN-α polypeptide encoded by a nucleic acid corresponding to one or more of GenBank accession number: J00210 (alpha-D), J00207 (Alpha-A), X02958 (Alpha-6), X02956 (Alpha-5), V00533 (alpha-H), V00542 (alpha-14), V00545 (IFN-1B), X03125 (alpha-8), X02957 (alpha-16), V00540 (alpha-21), X02955 (alpha-

4b), V00532 (alpha-C), X02960 (alpha-7), X02961 (alpha-10 pseudogene), R0067 (Gx-1), I01614, I01787, I07821, M12350 (alpha-F), M38289, V00549 (alpha-2a), and I08313 (alpha-Con1).

65. An antibody or antisera which specifically binds a polypeptide, the polypeptide comprising a sequence selected from the group consisting of: SEQ ID NO:36 to SEQ ID NO:70 or SEQ ID NO:79 to SEQ ID NO:85, wherein the antibody or antisera does not specifically bind to an IFN-alpha polypeptide encoded by a nucleic acid corresponding to one or more of GenBank accession number: J00210 (alpha-D), J00207 (Alpha-A), X02958 (Alpha-6), X02956 (Alpha-5), V00533 (alpha-H), V00542 (alpha-14), V00545 (IFN-1B), X03125 (alpha-8), X02957 (alpha-16), V00540 (alpha-21), X02955 (alpha-4b), V00532 (alpha-C), X02960 (alpha-7), X02961 (alpha-10 pseudogene), R0067 (Gx-1), I01614, I01787, I07821, M12350 (alpha-F), M38289, V00549 (alpha-2a), and I08313 (alpha-Con1).

66. A method of producing a polypeptide, the method comprising:

introducing into a population of cells a nucleic acid of claim 1, 2, 3, 8, or 18, the nucleic acid operatively linked to a regulatory sequence effective to produce the encoded polypeptide; and

culturing the cells in a culture medium to produce the polypeptide.

67. A method of producing a polypeptide, the method comprising:

introducing into a population of cells a recombinant expression vector comprising the nucleic acid of claim 1, 2, 3, 8, or 18; and

culturing the cells in a culture medium under conditions suitable to produce the polypeptide encoded by the expression vector.

68. A method of inhibiting growth of population of tumor cells, the method comprising:

contacting the population of tumor cells with an effective amount of a polypeptide of claim 34, 37, 41, or 51 sufficient to inhibit growth of tumor cells in said population of tumor cells, thereby inhibiting growth of tumor cells in said population of cells.

69. The method of claim 68, wherein the tumor cells are selected from the group consisting of: human carcinoma cells, human leukemia cells, human T-lymphoma cells, and human melanoma cells.

70. The method of claim 68, wherein the tumor cells are in culture.

71. A method of inhibiting the replication of a virus within at least one cell infected by the virus, the method comprising:

contacting said at least one infected cell with an effective amount of a polypeptide of claim 34, 37, 41, or 51 sufficient to inhibit viral replication in said at least one infected cell, thereby inhibiting replication of the virus in said at least one infected cells.

72. The method of claim 71, wherein the virus is an RNA virus.

73. The method of claim 72, wherein the virus is a human immunodeficiency virus or a hepatitis C virus.

74. The method of claim 71, wherein the virus is a DNA virus.

75. The method of claim 74, wherein the virus is a hepatitis B virus.

76. The method of claim 71, wherein the cells are cultured.

77. A method of treating an autoimmune disorder in a patient, the method comprising: administering to the patient an effective amount of the polypeptide of claim 34, 37, 41, or 51.

78. The method of claim 77, wherein the autoimmune disorder is selected from the group consisting of multiple sclerosis, rheumatoid arthritis, lupus erythematosus, and type I diabetes.

79. In a method of treating a disorder treatable by administration of interferon-alpha to a subject, an improved method comprising: administering to the subject an effective amount of the polypeptide of claim 34, 37, 41, or 51.

80. The method claim 79, wherein the disorder treatable by administration of interferon-alpha is selected from the group consisting of: sclerosis, rheumatoid arthritis, lupus erythematosus, and type I diabetes.

81. A method of for making a modified or recombinant nucleic acid, the method comprising:

recursively recombining a sequence of one or more nucleic acids of claim 1, 2, 3, 8, or 18 with a sequence of one or more additional nucleic acids, each sequence of the one or more additional nucleic acids encoding an interferon-alpha or an amino acid subsequence thereof.

82. The method of claim 81, wherein said recursive recombination produces at least one library of recombinant interferon-alpha homologue nucleic acids.

83. A nucleic acid library produced by the method of claim 82.

84. A population of cells comprising the library of claim 83.

85. A recombinant interferon-alpha homologue nucleic acid produced by the method of claim 82.

86. A cell comprising the nucleic acid of claim 85.

87. The method of claim 81, wherein the recursive recombination is performed *in vitro*.

88. The method of claim 81, wherein the recursive recombination is performed *in vivo* or *ex vivo*.

89. A composition comprising two or more nucleic acids of claim 1, 2, 3, 8, or 18.

90. The composition of claim 89, wherein the composition comprises a library comprising at least ten nucleic acids.

91. A method of producing a modified or recombinant interferon-alpha homologue nucleic acid comprising mutating a nucleic acid of claim 1, 2, 3, 8, or 18.

92. The modified or recombinant interferon-alpha homologue nucleic acid produced by the method of claim 91.

93. A computer or computer readable medium comprising a database comprising a sequence record comprising one or more character strings corresponding to a nucleic acid or protein sequence selected from SEQ ID NO:1 to SEQ ID NO:85.

94. An integrated system comprising a computer or computer readable medium comprising a database comprising one or more sequence records, each of said sequence records comprising one or more character strings corresponding to a nucleic acid or protein sequence selected from SEQ ID NO:1 to SEQ ID NO:85, the integrated system further comprising a user input interface allowing a user to selectively view said one or more sequence records.

95. The integrated system of claim 94, the computer or computer readable medium comprising an alignment instruction set which aligns the character strings with one or more additional character strings corresponding to a nucleic acid or protein sequence.

96. The integrated system of claim 95, wherein the instruction set comprises one or more of: a local homology comparison determination, a homology alignment determination, a search for similarity determination, and a BLAST determination.

97. The integrated system of claim 95, further comprising a user readable output element which displays an alignment produced by the alignment instruction set.

98. The integrated system of claim 94, the computer or computer readable medium further comprising an instruction set which translates at least one nucleic acid sequence comprising a sequence selected from SEQ ID NO:1 to SEQ ID NO:35 or SEQ ID NO:72 to SEQ ID NO:78 into an amino acid sequence.

99. The integrated system of claim 94, the computer or computer readable medium further comprising an instruction set for reverse-translating at least one amino acid sequence comprising a sequence selected from SEQ ID NO:36 to SEQ ID NO:70 or SEQ ID NO:79 to SEQ ID NO:85 into a nucleic acid sequence.

100. The integrated system of claim 99, wherein the instruction set selects the nucleic acid sequence by applying a codon usage instruction set or an instruction set which determines sequence identity to a test nucleic acid sequence.

101. A method of using a computer system to present information pertaining to at least one of a plurality of sequence records stored in a database, said sequence records each comprising at least one character string corresponding to SEQ ID NO:1 to SEQ ID NO:85, the method comprising:

determining a list of at least one character string corresponding to one or more of SEQ ID NO:1 to SEQ ID NO:85 or a subsequence thereof;

determining which of said at least one character string of said list are selected by a user; and

displaying each of the selected character strings, or aligning each of the selected character strings with an additional character string.

102. The method of claim 101, further comprising displaying an alignment of each of the selected character strings with the additional character string.

103. The method of claim 101, further comprising displaying the list.

104. A nucleic acid which comprises a unique subsequence in a nucleic acid selected from SEQ ID NO:1 to SEQ ID NO:35 or SEQ ID NO:72 to SEQ ID NO:78, wherein the unique subsequence is unique as compared to a nucleic acid sequence of a known interferon-alpha nucleic acid sequence or a nucleic acid corresponding to any of GenBank accession number: J00210 (alpha-D), J00207 (Alpha-A), X02958 (Alpha-6), X02956 (Alpha-5), V00533 (alpha-H), V00542 (alpha-14), V00545 (IFN-1B), X03125 (alpha-8), X02957 (alpha-16), V00540 (alpha-21), X02955 (alpha-4b), V00532 (alpha-

C), X02960 (alpha-7), X02961 (alpha-10 pseudogene), R0067 (Gx-1), I01614, I01787, I07821, M12350 (alpha-F), M38289, V00549 (alpha-2a), and I08313 (alpha-Con1).

105. A polypeptide which comprises a unique subsequence in a polypeptide selected from: SEQ ID NO:36 to SEQ ID NO:70 or SEQ ID NO:79 to SEQ ID NO:85, wherein the unique subsequence is unique as compared to a sequence of a known interferon-alpha polypeptide or a sequence of a polypeptide encoded by a nucleic acid corresponding to any of GenBank accession number: J00210 (alpha-D), J00207 (Alpha-A), X02958 (Alpha-6), X02956 (Alpha-5), V00533 (alpha-H), V00542 (alpha-14), V00545 (IFN-1B), X03125 (alpha-8), X02957 (alpha-16), V00540 (alpha-21), X02955 (alpha-4b), V00532 (alpha-C), X02960 (alpha-7), X02961 (alpha-10 pseudogene), R0067 (Gx-1), I01614, I01787, I07821, M12350 (alpha-F), M38289, V00549 (alpha-2a), and I08313 (alpha-Con1).

106. A target nucleic acid which hybridizes under stringent conditions to a unique coding oligonucleotide which encodes a unique subsequence in a polypeptide selected from: SEQ ID NO:36 to SEQ ID NO:70 or SEQ ID NO:79 to SEQ ID NO:85, wherein the unique subsequence is unique as compared to a sequence of a known interferon-alpha polypeptide or a sequence of a polypeptide encoded by a nucleic acid corresponding to any of GenBank accession number: J00210 (alpha-D), J00207 (Alpha-A), X02958 (Alpha-6), X02956 (Alpha-5), V00533 (alpha-H), V00542 (alpha-14), V00545 (IFN-1B), X03125 (alpha-8), X02957 (alpha-16), V00540 (alpha-21), X02955 (alpha-4b), V00532 (alpha-C), X02960 (alpha-7), X02961 (alpha-10 pseudogene), R0067 (Gx-1), I01614, I01787, I07821, M12350 (alpha-F), M38289, V00549 (alpha-2a), and I08313 (alpha-Con1).

107. The nucleic acid of claim 106, wherein the stringent conditions are selected such that a perfectly complementary oligonucleotide to the unique coding oligonucleotide hybridizes to the unique coding oligonucleotide with at least a 5x higher signal to noise ratio than for hybridization of the perfectly complementary oligonucleotide to a control nucleic acid corresponding to any of GenBank accession number: J00210 (alpha-D), J00207 (Alpha-A), X02958 (Alpha-6), X02956 (Alpha-5),

V00533 (alpha-H), V00542 (alpha-14), V00545 (IFN-1B), X03125 (alpha-8), X02957 (alpha-16), V00540 (alpha-21), X02955 (alpha-4b), V00532 (alpha-C), X02960 (alpha-7), X02961 (alpha-10 pseudogene), R0067 (Gx-1), I01614, I01787, I07821, M12350 (alpha-F), M38289,V00549 (alpha-2a), and I08313 (alpha-Con1), wherein the target nucleic acid hybridizes to the unique coding oligonucleotide with at least a 2x higher signal to noise ratio as compared to hybridization of the control nucleic acid to the coding oligonucleotide.

108. The nucleic acid of any of claims 1, 2, 3, 8, or 18, wherein the nucleic acid encodes an interferon-alpha homologue having an increased growth inhibition activity against a population of cancer cells relative to a growth inhibition activity of human interferon-alpha 2a against said population of cancer cells.

109. The nucleic acid of claim 108, wherein the cancer cells of said population of cancer cells comprise a cancer cell line selected from: a leukemia cell line, a melanoma cell line, a lung cancer cell line, a colon cancer cell line, a central nervous system (CNS) cancer cell line, an ovarian cancer cell line, a breast cancer cell line, a prostate cancer cell line, and a renal cancer cell line, and the growth inhibition activity is measured as a concentration of interferon-alpha homologue producing a 50% inhibition of growth of the cancer cell line (GI50 value), wherein the interferon-alpha homologue has a GI50 value at least 2-fold lower than the GI50 value of the human interferon-alpha 2a.

110. The nucleic acid of claim 109, wherein the encoded interferon-alpha homologue has a GI50 value at least 5-fold lower than the GI50 value of the human interferon-alpha 2a.

111. The nucleic acid of claim 107, wherein the encoded interferon-alpha homologue has a GI50 value at least 10-fold lower than the GI50 value of the human interferon-alpha 2a.

112. The nucleic acid of any of claims 1, 2, 3, 8, or 18, wherein the nucleic acid encodes an interferon-alpha homologue having increased an cytostatic

activity against a population of cancer cells relative to the cytostatic activity of human interferon-alpha 2a against said population of cancer cells.

113. The nucleic acid of claim 112, wherein the cancer cells comprise a cancer cell line selected from: a leukemia cell line, a melanoma cell line, a lung cancer cell line, a colon cancer cell line, a CNS cancer cell line, an ovarian cancer cell line, a breast cancer cell line, a prostate cancer cell line, and a renal cancer cell line, the cytostatic activity measured as the concentration of an interferon-alpha causing a total inhibition of growth of the cell line (TGI value), wherein the interferon-alpha homologue has a TGI value at least 2-fold lower than the TGI value of the human interferon-alpha 2a.

114. The nucleic acid of claim 112, wherein the encoded interferon-alpha homologue has a TGI value at least 5-fold lower than the TGI value of the human interferon-alpha 2a.

115. The nucleic acid of claim 112, wherein the encoded interferon-alpha homologue has a TGI value at least 10-fold lower than the TGI value of the human interferon-alpha 2a.

116. The nucleic acid of any of claims 1, 2, 3, 8, or 18, wherein the nucleic acid encodes an interferon-alpha homologue having an increased cytotoxic activity against a population of cancer cells relative to the cytotoxic activity of human interferon-alpha 2a against said population of cancer cells.

117. The nucleic acid of claim 116, wherein the cancer cells comprise a cancer cell line selected from: a leukemia cell line, a melanoma cell line, a lung cancer cell line, a colon cancer cell line, a central nervous system (CNS) cancer cell line, an ovarian cancer cell line, a breast cancer cell line, a prostate cancer cell line, and a renal cancer cell line, the cytotoxic activity measured as the concentration of interferon-alpha producing a 50% reduction in an amount of cellular protein in a cell line measured after a period of incubation (LC50 value), wherein the interferon-alpha homologue has a LC50 value at least 2-fold lower than the LC50 value of the human interferon-alpha 2a.

118. The nucleic acid of claim 116, wherein the encoded interferon-alpha homologue has a LC50 value at least 5-fold lower than the LC50 value of the human interferon-alpha 2a.

119. The nucleic acid of claim 116, wherein the encoded interferon-alpha homologue has a LC50 value at least 10-fold lower than the LC50 value of the human interferon-alpha 2a.

120. The polypeptide of claim 34, 37, 41, or 51, said polypeptide having an increased growth inhibition activity against a population of cancer cells relative to the inhibition activity of human interferon-alpha 2a against the population of cancer cells.

121. The polypeptide of claim 120, wherein the population of cancer cells comprises a cancer cell line selected from: a leukemia cell line, a melanoma cell line, a lung cancer cell line, a colon cancer cell line, a CNS cancer cell line, an ovarian cancer cell line, a breast cancer cell line, a prostate cancer cell line, and a renal cancer cell line, the growth inhibition activity measured as the concentration of polypeptide or human interferon-alpha 2a causing a 50% inhibition of growth of the cell line (GI50 value), wherein the polypeptide has a GI50 value at least 2-fold lower than the GI50 value of the human interferon-alpha 2a.

122. A nucleic acid produced by the method of claim 81.

123. An interferon-alpha polypeptide or amino acid subsequence thereof produced by the method of claim 81.

124. The polypeptide of claim 31, further comprising a secretion/localization sequence.

125. The polypeptide of claim 31, further comprising a polypeptide purification subsequence.

126. The polypeptide of claim 125, wherein the sequence that facilitates purification is selected from the group consisting of: an epitope tag, a FLAG tag, a polyhistidine tag, and a GST fusion.

127. The polypeptide of claim 31, further comprising a Met at the N-terminus.

128. The polypeptide of claim 31, comprising a modified amino acid.

129. The polypeptide of claim 128, wherein the modified amino acid is selected from the group consisting of: a glycosylated amino acid, a PEGylated amino acid, a farnesylated amino acid, an acetylated amino acid, and a biotinylated amino acid.

130. A composition comprising the polypeptide of claim 31, and an excipient.

131. The composition of claim 130, wherein the excipient is a pharmaceutically acceptable excipient.

132. A composition comprising the polypeptide of claim 128 in a pharmaceutically acceptable excipient.

133. An antibody or antisera produced by administering the polypeptide of claim 31, to a mammal, which antibody or antisera specifically binds at least one antigen, said at least one antigen comprising a polypeptide comprising one or more of the amino acid sequences of SEQ ID NO:36 to SEQ ID NO:70 and SEQ ID NO:79 to SEQ ID NO:85, or a fragment thereof, which antibody or antisera does not specifically bind to an IFN-• polypeptide encoded by a nucleic acid corresponding to one or more of GenBank accession number: J00210 (alpha-D), J00207 (Alpha-A), X02958 (Alpha-6), X02956 (Alpha-5), V00533 (alpha-H), V00542 (alpha-14), V00545 (IFN-1B), X03125 (alpha-8), X02957 (alpha-16), V00540 (alpha-21), X02955 (alpha-4b), V00532 (alpha-C), X02960 (alpha-7), X02961 (alpha-10 pseudogene), R0067 (Gx-1), I01614, I01787, I07821, M12350 (alpha-F), M38289, V00549 (alpha-2a), and I08313 (alpha-Con1).

134. A method of inhibiting growth of population of tumor cells, the method comprising:

contacting the population of tumor cells with an effective amount of a polypeptide of claim 31 sufficient to inhibit growth of tumor cells in said population of tumor cells, thereby inhibiting growth of tumor cells in said population of cells.

135. The method of claim 134, wherein the tumor cells are selected from the group consisting of: human carcinoma cells, human leukemia cells, human T-lymphoma cells, and human melanoma cells.

136. The method of claim 134, wherein the tumor cells are in culture.

137. A method of inhibiting the replication of a virus within at least one cell infected by the virus, the method comprising:

contacting said at least one infected cell with an effective amount of a polypeptide of claim 31 sufficient to inhibit viral replication in said at least one infected cell, thereby inhibiting replication of the virus in said at least one infected cells.

138. The method of claim 137, wherein the virus is an RNA virus.

139. The method of claim 138, wherein the virus is a human immunodeficiency virus or a hepatitis C virus.

140. The method of claim 137, wherein the virus is a DNA virus.

141. The method of claim 139, wherein the virus is a hepatitis B virus.

142. The method of claim 137, wherein the cells are cultured.

143. A method of treating an autoimmune disorder in a patient, the method comprising: administering to the patient an effective amount of the polypeptide of claim 31.

144. The method of claim 143, wherein the autoimmune disorder is selected from the group consisting of multiple sclerosis, rheumatoid arthritis, lupus erythematosus, and type I diabetes.

145. In a method of treating a disorder treatable by administration of interferon-alpha to a subject, an improved method comprising: administering to the subject an effective amount of the polypeptide of claim 31.

146. The method claim 145, wherein the disorder treatable by administration of interferon-alpha is selected from the group consisting of: sclerosis, rheumatoid arthritis, lupus erythematosus, and type I diabetes.

147. The polypeptide of claim 31, said polypeptide having an increased growth inhibition activity against a population of cancer cells relative to the inhibition activity of human interferon-alpha 2a against the population of cancer cells.

148. The polypeptide of claim 147, wherein the population of cancer cells comprises a cancer cell line selected from: a leukemia cell line, a melanoma cell line, a lung cancer cell line, a colon cancer cell line, a CNS cancer cell line, an ovarian cancer cell line, a breast cancer cell line, a prostate cancer cell line, and a renal cancer cell line, the growth inhibition activity measured as the concentration of polypeptide or human interferon-alpha 2a causing a 50% inhibition of growth of the cell line (GI50 value), wherein the polypeptide has a GI50 value at least 2-fold lower than the GI50 value of the human interferon-alpha 2a.